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TITLE: Method and system for limiting data packet transmission within a digital mobile telephone communication network by discarding unsuccessfully transmitted radio link protocol frames

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INVENTOR-INFORMATION:

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US-CL-CURRENT: 370/342, 370/474

ABSTRACT:

An improved method and system for limiting data packet transmission within a digital mobile telephone communication network, such as a code division multiple access (CDMA) mobile telephone communication network, by discarding unsuccessfully transmitted radio link protocol frames is disclosed. A code division multiple access (CDMA) mobile telephone communication network includes a mobile telephone, a base station, a mobile switching center, and a network Interworking Function. Within the CDMA mobile telephone communication network, each point-to-point protocol data packet is typically divided into multiple radio link protocol frames before their transmissions over an air link. In accordance with a method and system of the present invention, a marker bit is provided for each of the radio link protocol frames. The marker bit can be part of the frame header and will be removed before air link transmission. The marker bit of a first one of the radio link protocol frames is set to a first logical state (such as a logical "1") and the rest of the radio link protocol frames are set to a second logical state (such as a logical "0"). In response

to an unsuccessful transmission of one of the radio link protocol frames, all of the radio link protocol frames within the same point-to-point protocol data packet having the marker bit set to the second logical state are discarded, after a predetermined number of unsuccessful re-transmission attempts.

14 Claims, 4 Drawing figures

Exemplary Claim Number: 1

Number of Drawing Sheets: 4

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Detailed Description Text - DETX (12):
After PPP packet 55 has been divided into multiple **RLP** frames 57, header bits (such as a **sequence number** of a next frame to be sent, a control **number,** and a frame length) are attached to each **RLP** frame 57. All **RLP** frames 57 are then sequentially loaded into a transmit buffer within the **RLP** layer. In addition, an **RLP** sender within the **RLP** layer maintains an 8-bit **sequence number**
counter for all the successfully transmitted frames. But whenever a frame is not received successfully, the receiver sends a **negative** acknowledge character (**NAK**) control frame requesting the **RLP** sender for a re-transmission. The **RLP** sender then tries to re-transmit the lost (or corrupted) frame for at most six times. Preferably, the **RLP** sender re-transmits all unsuccessfully transmitted frames within a PPP data packet using a minimum of three and a maximum of six re-transmissions for each frame. If the **RLP** sender fails to transmit a frame successfully after six re-transmission attempts, under the prior art implementation, the **RLP** sender will continue to transmit all frames subsequent to the lost frame because the **RLP** sender is oblivious of the higher level packet structure. However, the effort of transmitting any frame subsequent to the lost frame is deemed unnecessary because a reliable transport protocol will retransmit the entire data packet again. For example, if a PPP data packet contains frames 1, 2, . . . , N in which frame m (where 1.ltoreq.m.ltoreq.N) could not be successfully transmitted after a predetermined number (from three to six) of retransmission attempts at the **RLP** layer, the frames after m (i.e., m+1, m+2, . . . , N) that are part of the same PPP data packet should not be

transmitted. This is because transmission (with possible re-transmission attempts) of these **RLP** frames will be duplicated in the future (when TCP re-transmits the data packet) and leads to unnecessary air link interference to other users, which will ultimately increase buffer requirements and will decrease TCP throughput due to longer delay. The present invention provides a mechanism to prevent the unnecessary data frame transmissions from happening.